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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/919,115	08/01/2001	Wolfgang Hoenlein	32226.11	3454
7590 05/04/2005			EXAMINER	
ALTERA LAW GROUP, LLC 6500 CITY WEST PARKWAY, SUITE 100 MINNEAPOLIS, MN 55344-7704			LISH, PETER J	
			ART UNIT	PAPER NUMBER
			1754	
DATE MAILED: 05/04/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/919,115

**Applicant(s)**

HOENLEIN ET AL.

**Examiner**

Peter J. Lish

**Art Unit**

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 25-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 25-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/30/04 has been entered.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 25, 27, and 31-34 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Shibuta (USPN 5,853,877).

Shibuta discloses the treatment of carbon fibrils, or multi-walled carbon nanotubes, with a particular solution comprising a strong acid containing sulfur in addition to an oxidizing agent (column 4, lines 29-35). The strong acid is preferably sulfuric acid and the oxidizing agent is preferably one having acidity in the strong acid, such as nitric acid, chromic acid, or hydrogen peroxide (column 4, line 66 – column 5, line 6). It is possible to treat the nanotubes at a temperature from room temperature to the boiling point of the acidic mixture (column 5, lines 17-18).

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In treating the nanotubes as such, the surface of the nanotubes is modified by oxidation to form a polar functional group such as a carbonyl, carboxyl, nitro, etc. (column 5, lines 28-40 and Table 1). While it is not explicitly stated that only the outer wall of the nanotube is substantially oxidized, it is equivalently stated that the surface of the nanotube is modified with functional groups. Alternatively, it is expected that the outer wall of the nanotube be substantially oxidized because the treatment is performed identically to that of the applicant. Similarly, it is expected that the nanotubes of Shibuta possess the insulating effect claimed by the applicant because no difference is seen between the process of Shibuta and that of the applicant. Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the burden of proof is shifted to the applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. See *In re Best*, 195 USPQ 430.

Shibuta also teaches that after the treatment, the nanotubes may be filtered, washed, and dispersed in solution, or isolated. This solution may then be used as a coating composition for the formation of an electrically conductive film by coating on a substrate (column 5, lines 41-53 and Examples 1, 4).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shibuta.

Shibuta is applied above. It is not explicitly taught that the substrate to which the film of nanotubes is applied be an electronic component, however, it would have been obvious to one of ordinary skill at the time of invention to apply the nanotube film to an electronic component because the potential use of nanotubes in electronics is well known.

Claims 26, 28, 30, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibuta as applied to claims 25, 27, and 31-34 above, and further in view of Stephan et al. ("Doping Graphitic and Carbon Nanotube Structures with Boron and Nitrogen").

Shibuta teaches a process for the treatment of carbon fibrils, or nanotubes, however does not teach the use of carbon nanotubes doped with boron and nitrogen. Stephan et al. discloses the production of multiwalled carbon nanotubes having carbon atoms substitutionally replaced by boron and nitrogen atoms in various amounts. It would have been obvious to one of ordinary skill at the time of invention to perform the process of Shibuta on the nanotubes of Stephan et al., in order to disentangle and disperse the doped nanotubes and also to take advantage of the electronic properties of the BN-doped nanotubes.

Shibuta does not explicitly teach that the substrate to which the film of nanotubes is applied be an electronic component, however, it would have been obvious to one of ordinary skill at the time of invention to apply the nanotube film to an electrical component because the potential use of nanotubes in electrical applications is well known.

***Response to Arguments***

Applicant's arguments filed 8/30/04 have been fully considered but they are not persuasive. The applicant argues that the prior art to Shibuta does not explicitly teach that the outer wall of the multi-walled nanotube is "substantially oxidized" to create an electrically insulating effect. However, it is seen that Shibuta indeed teaches that the surface of the nanotubes are modified by oxidation to form polar functional groups, which is seen to be the requirement of a "substantial oxidation". Additionally, the applicant argues that Shibuta does not teach the electrically insulating effect caused by a substantial oxidation. However, because no difference is seen between the process of the applicant and the process of Shibuta, it is expected that such an effect occur. Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the burden of proof is shifted to the applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. See *In re Best*, 195 USPQ 430.

The applicants additionally argue that the technical problem addressed by Shibuta is not the same as that addressed by the applicant. However, while this may not necessarily be the case, the process of Shibuta is seen to be the same as that used by the applicant. The idea that the applicant may have found an additional benefit or use for the treated nanotubes does not, in itself, provide patentability.

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***Conclusion***

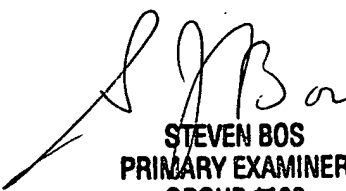
The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Ago et al. "Work Functions and Surface Functional Groups of Multiwalled Carbon Nanotubes".

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J. Lish whose telephone number is 571-272-1354. The examiner can normally be reached on 9:00-6:00 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PL

  
**STEVEN BOS**  
**PRIMARY EXAMINER**  
**GROUP 1700**